

### A8.5 Worksheets for the LULUCF sector

**Module** Land-use change and forestry (New Zealand)  
**Submodule** Changes in forest and other woody biomass stocks  
**Worksheet** Equivalent to 5.1 (2 of 3)  
**Sheet** Carbon release from harvesting in *Pinus radiata* plantations (temperate) and native forests

	Stem volume in plantation forest harvest <sup>1</sup> (merch. m <sup>3</sup> )	Biomass conversion ratio <sup>2</sup> (t dm/m <sup>3</sup> )	Dry matter in stem <sup>1 3</sup> t C/t dm = 0.5 (t dm)	Carbon in plantation forest harvest <sup>1</sup> (t C)	Stem volume in native forest harvest (merch. m <sup>3</sup> )	Biomass conversion ratio (t dm/m <sup>3</sup> )	Biomass expansion ratio (t dm/m <sup>3</sup> )	Dry matter in total native forest harvest (t dm)	Carbon in native forest harvest (t C) t C/t dm = 0.5	Carbon release from total forest harvest (t C)
1990	10,813,787	0.461	4,985,514	2,492,757	365,000	0.50	2.04	372,300	186,150	2,678,907
1991	11,797,488	0.461	5,439,033	2,719,516	307,667	0.50	2.04	313,820	156,910	2,876,426
1992	12,500,583	0.461	5,763,183	2,881,591	257,333	0.50	2.04	262,480	131,240	3,012,831
1993	13,232,522	0.461	6,100,631	3,050,316	205,000	0.50	2.04	209,100	104,550	3,154,866
1994	13,987,203	0.461	6,448,564	3,224,282	158,000	0.50	2.04	161,160	80,580	3,304,862
1995	14,700,793	0.461	6,777,553	3,388,776	107,333	0.50	2.04	109,480	54,740	3,443,516
1996	15,214,390	0.461	7,014,338	3,507,169	50,000	0.50	2.04	51,000	25,500	3,532,669
1997	15,202,118	0.461	7,008,681	3,504,340	56,667	0.50	2.04	57,800	28,900	3,533,240
1998	15,746,397	0.461	7,259,611	3,629,806	57,667	0.50	2.04	58,820	29,410	3,659,216
1999	16,672,535	0.461	7,686,591	3,843,296	57,000	0.50	2.04	58,140	29,070	3,872,366
2000	18,228,284	0.461	8,403,843	4,201,922	38,333	0.50	2.04	39,100	19,550	4,221,472
2001	19,711,404	0.461	9,087,610	4,543,805	23,000	0.50	2.04	23,460	11,730	4,555,535
2002	20,419,021	0.461	9,413,846	4,706,923	16,667	0.50	2.04	17,000	8,500	4,715,423
2003	20,106,098	0.461	9,269,577	4,634,789	9,667	0.50	2.04	9,860	4,930	4,639,719
2004	19,133,626	0.462	8,843,636	4,421,818	7,667	0.50	2.04	7,820	3,910	4,425,728

**Module** Land-use change and forestry (New Zealand)  
**Submodule** Changes in forest and other woody biomass stocks  
**Worksheet** Equivalent to 5.1 (1 of 3)  
**Sheet** Carbon uptake in *Pinus radiata* plantations (temperate)

	Total forest estate area (net of harvest) (ha)	Total Forest estate carbon (net of harvest) (t C)	Forest estate carbon uptake (net of harvest) (t C)	Forest Estate Crop uptake (before harvest) (t C)	Forest Estate Shrub uptake (before harvest) (t C)	Forest Estate DOM* uptake (before harvest) (t C)	Forest Estate soil (not included in total carbon) (t C)	Carbon in plantation forest harvest (t C)	Total forest carbon uptake (before harvest) (t C)
1990	1,184,884	112,041,802	5,811,122	6,498,480	101,754	1,703,666	1,912,774	2,492,757	8,303,880
1991	1,211,537	117,564,626	5,522,825	6,581,828	99,189	1,561,224	2,451,739	2,719,516	8,242,341
1992	1,250,219	122,795,595	5,230,968	6,609,125	96,645	1,406,790	3,747,978	2,881,591	8,112,560
1993	1,312,586	127,875,773	5,080,178	6,687,033	96,750	1,346,712	6,342,142	3,050,316	8,130,494
1994	1,388,015	132,923,040	5,047,267	6,791,309	98,162	1,382,078	7,743,524	3,224,282	8,271,549
1995	1,471,062	137,973,594	5,050,553	6,971,401	100,456	1,367,473	8,534,784	3,388,776	8,439,330
1996	1,547,997	143,149,902	5,176,308	7,224,150	104,327	1,355,001	7,792,911	3,507,169	8,683,477
1997	1,618,343	148,719,074	5,569,172	7,585,467	110,398	1,377,647	6,932,627	3,504,340	9,073,512
1998	1,675,967	154,599,528	5,880,454	8,054,681	121,234	1,334,344	5,619,383	3,629,806	9,510,260
1999	1,722,793	160,733,279	6,133,751	8,448,682	126,144	1,402,221	4,489,120	3,843,296	9,977,047
2000	1,761,242	166,945,582	6,212,302	8,784,702	127,029	1,502,493	3,683,150	4,201,922	10,414,224
2001	1,794,483	173,288,966	6,343,385	8,978,906	120,781	1,787,503	3,084,228	4,543,805	10,887,190
2002	1,823,075	179,708,653	6,419,686	9,146,109	115,437	1,865,062	2,448,320	4,706,923	11,126,609
2003	1,847,130	186,510,386	6,801,733	9,388,698	115,706	1,932,118	1,770,614	4,634,789	11,436,522
2004	1,865,374	193,674,595	7,164,209	9,751,426	126,510	1,708,091	974,838	4,421,818	11,586,027

**Module** Land-use change and forestry (New Zealand)  
**Submodule** Changes in forest and other woody biomass stocks  
**Worksheet** Equivalent to 5.1 (3 of 3)  
**Sheet** Net Carbon uptake in forest

	Total forest carbon uptake (before harvest) (Gg C)	Carbon release from total forest harvest (Gg C)	Carbon uptake from Crop (before harvest) (Gg C)	Carbon uptake from shrub (before harvest) (Gg C)	Carbon uptake dead matter in soil (not included in total uptake) (Gg C)	Carbon uptake in total uptake) (Gg C)	Net carbon uptake in forests (Gg C)	Net CO2 uptake in forests (Gg CO2)
1990	8,304	2,679	6,498	102	1,704	1,913	5,625	20,625
1991	8,242	2,876	6,582	99	1,561	2,452	5,366	19,675
1992	8,113	3,013	6,609	97	1,407	3,748	5,100	18,699
1993	8,130	3,155	6,587	97	1,347	6,342	4,976	18,244
1994	8,272	3,305	6,791	98	1,382	7,744	4,967	18,211
1995	8,439	3,444	6,971	100	1,367	8,535	4,996	18,318
1996	8,683	3,533	7,224	104	1,355	7,793	5,151	18,886
1997	9,074	3,533	7,585	110	1,378	6,933	5,540	20,314
1998	9,510	3,659	8,055	121	1,334	5,619	5,851	21,454
1999	9,977	3,872	8,449	126	1,402	4,489	6,105	22,384
2000	10,414	4,221	8,785	127	1,502	3,683	6,193	22,707
2001	10,887	4,556	8,979	121	1,788	3,084	6,332	23,216
2002	11,127	4,715	9,146	115	1,865	2,448	6,411	23,508
2003	11,437	4,640	9,389	116	1,932	1,771	6,797	24,922
2004	11,586	4,426	9,751	127	1,708	975	7,160	26,254



**Module** Land-use change and forestry (New Zealand)  
**Submodule** Land converted to forest  
**Worksheet**  
**Sheet** Carbon release from grassland (woody vegetation) cleared for new forest planting

	Grassland Clearance where forest planting <sup>1</sup>		Quantity of scrub biomass burned (t dm/ha = 136)	Oxidised biomass (90% of total) (t dm)	C release from burning scrub (t C/t dm = 0.5) (t C)	CO2 release from burning for new planting (t CO2)	Clearance where scrub decays <sup>2</sup>		Initial quantity of biomass to decay <sup>3</sup> (t dm/ha =136) (t dm)	Added biomass left to decay after fire (10 %) (t dm)	C release from decay over period (t C/t dm = 0.5) (t C)	CO2 release from decay for new planting (t CO2)
	(ha)	(25% of total) (ha)					(75% of total) (ha)	(ha)				
1990	3,885	971	132,106	118,895	59,448	217,975	2,914	396,318	0	198,159	726,582	
1991	3,579	895	121,679	109,511	54,756	200,771	2,684	365,038	0	182,519	669,236	
1992	5,427	1,357	184,507	166,056	83,028	304,436	4,070	553,520	0	276,760	1,014,787	
1993	6,784	1,696	230,656	207,590	103,795	380,582	5,088	691,968	0	345,984	1,268,608	
1994	11,200	2,800	380,800	342,720	171,360	628,320	8,400	1,142,400	0	571,200	2,094,400	
1995	8,569	2,142	291,346	262,211	131,106	480,721	6,427	874,038	0	437,019	1,602,403	
1996	11,933	2,983	405,711	365,140	182,570	669,423	8,950	1,217,132	0	608,566	2,231,409	
1997	10,323	2,581	350,971	315,874	157,937	579,102	7,742	1,052,912	0	526,456	1,930,339	
1998	5,955	1,489	202,470	182,223	91,112	334,076	4,466	607,410	0	303,705	1,113,585	
1999	7,229	1,807	245,775	221,197	110,599	405,528	5,422	737,324	0	368,662	1,351,761	
2000	7,072	1,768	240,448	216,403	108,202	396,739	5,304	721,344	0	360,672	1,322,464	
2001	7,950	1,988	270,311	243,280	121,640	446,014	5,963	810,934	0	405,467	1,486,712	
2002	5,720	1,430	194,480	175,032	87,516	320,892	4,290	583,440	0	291,720	1,069,640	
2003	6,249	1,562	212,455	191,209	95,605	350,550	4,687	637,364	0	318,682	1,168,501	
2004	4,559	1,140	154,995	139,495	69,748	255,741	3,419	464,984	0	232,492	852,471	

**Module** Land-use change and forestry (New Zealand)  
**Submodule** Grassland remaining grassland/forest land remaining forest land  
**Worksheet**  
**Sheet** Carbon release from wildfires

	Area of grassland burned in wildfires <sup>1</sup>		Quantity of biomass burned (t dm/ha = 136) (t dm)	Oxidised biomass (90% of total) (t dm)	C release from scrub wildfires (t C/t dm = 0.5) (t C)	Area of Forest burned in wildfires <sup>1</sup>		Quantity of biomass burned (t dm/ha = 364) (t dm)	Oxidised biomass (90 % of total) (t dm)	C release from forest wildfires (t C/t dm = 0.5) (t C)
	(ha)	(ha)				(ha)	(ha)			
1990	2,564		348,738	313,864	156,932	323	117,663	105,897	52,948	
1991	2,064		280,659	252,593	126,296	207	75,318	67,786	33,893	
1992	1,954		265,744	239,170	119,585	165	60,151	54,136	27,068	
1993	2,330		316,812	285,131	142,565	239	86,814	78,133	39,066	
1994	2,529		343,978	309,580	154,790	314	114,266	102,839	51,420	
1995	2,645		359,765	323,789	161,894	472	171,929	154,736	77,368	
1996	2,532		344,318	309,886	154,943	727	264,598	238,138	119,069	
1997	3,320		451,565	406,409	203,204	762	277,520	249,768	124,884	
1998	3,268		444,391	399,952	199,976	692	251,949	226,754	113,377	
1999	3,049		414,709	373,238	186,619	403	146,571	131,914	65,957	
2000	2,119		288,184	259,366	129,683	334	121,576	109,418	54,709	
2001	1,954		265,789	239,210	119,605	282	102,648	92,383	46,192	
2002	2,165		294,440	264,996	132,498	283	102,891	92,602	46,301	
2003	2,030		276,080	248,472	124,236	284	103,255	92,929	46,465	
2004	1,898		258,098	232,288	116,144	285	103,740	93,366	46,683	

**Module** Land-use change and forestry (New Zealand)  
**Submodule** Forest land remaining forest land  
**Worksheet**  
**Sheet** Non-CO2 emissions from the on-site burning of forests

	Carbon release by on-site burning (t C)	Nitrogen released (t N/t c = 0.01) (t C)	Carbon in CH <sub>4</sub> emissions (ratio = 0.012) (t C)	Nitrogen in N <sub>2</sub> O emissions (ratio = 0.007) (t N)	Nitrogen in NO <sub>x</sub> emissions (ratio = 0.121) (t N)	Carbon in CO emissions (ratio = 0.06) (t C)	CH <sub>4</sub> emissions from burning (ratio = 1.333) (Gg CH <sub>4</sub> )	N <sub>2</sub> O emissions from burning (ratio = 1.571) (Gg N <sub>2</sub> O)	NO <sub>x</sub> emissions from burning (ratio = 3.286) (Gg NO <sub>x</sub> )	CO emissions from burning (ratio = 2.333) (Gg CO)
1990	52,948	529	635	4	64	3,177	0.847	0.006	0.211	7.412
1991	33,893	339	407	2	41	2,034	0.542	0.004	0.135	4.744
1992	27,068	271	325	2	33	1,624	0.433	0.003	0.108	3.789
1993	39,066	391	469	3	47	2,344	0.625	0.004	0.155	5.469
1994	51,420	514	617	4	62	3,085	0.823	0.006	0.204	7.198
1995	77,368	774	928	5	94	4,642	1.238	0.009	0.308	10.830
1996	119,069	1,191	1,429	8	144	7,144	1.905	0.013	0.473	16.667
1997	124,884	1,249	1,499	9	151	7,493	1.998	0.014	0.497	17.481
1998	113,377	1,134	1,361	8	137	6,803	1.814	0.012	0.451	15.870
1999	65,957	660	791	5	80	3,957	1.055	0.007	0.262	9.233
2000	54,709	547	657	4	66	3,283	0.875	0.006	0.218	7.658
2001	46,192	462	554	3	56	2,771	0.739	0.005	0.184	6.466
2002	46,301	463	556	3	56	2,778	0.741	0.005	0.184	6.481
2003	46,465	465	558	3	56	2,788	0.743	0.005	0.185	6.504
2004	46,683	467	560	3	56	2,801	0.747	0.005	0.186	6.535

**Module** Land-use change and forestry (New Zealand)  
**Submodule** Grassland remaining grassland  
**Worksheet**  
**Sheet** Non-CO2 emissions from the on-site burning of scrub - WILDFIRE ONLY

	Carbon release by on-site burning (t C)	Nitrogen released (t N/t c = 0.01) (t C)	Carbon in CH <sub>4</sub> emissions (ratio = 0.012) (t C)	Nitrogen in N <sub>2</sub> O emissions (ratio = 0.007) (t N)	Nitrogen in NO <sub>x</sub> emissions (ratio = 0.121) (t N)	Carbon in CO emissions (ratio = 0.06) (t C)	CH <sub>4</sub> emissions from burning (ratio = 1.333) (Gg CH <sub>4</sub> )	N <sub>2</sub> O emissions from burning (ratio = 1.571) (Gg N <sub>2</sub> O)	NO <sub>x</sub> emissions from burning (ratio = 3.286) (Gg NO <sub>x</sub> )	CO emissions from burning (ratio = 2.333) (Gg CO)
1990	156,932	1,569	1,883	11	190	9,416	2.510	0.017	0.624	21.967
1991	126,296	1,263	1,516	9	153	7,578	2.020	0.014	0.502	17.679
1992	119,585	1,196	1,435	8	145	7,175	1.913	0.013	0.475	16.739
1993	142,565	1,426	1,711	10	173	8,554	2.280	0.016	0.567	19.956
1994	154,790	1,548	1,857	11	187	9,287	2.476	0.017	0.615	21.668
1995	161,894	1,619	1,943	11	196	9,714	2.590	0.018	0.644	22.662
1996	154,943	1,549	1,859	11	187	9,297	2.478	0.017	0.616	21.689
1997	203,204	2,032	2,438	14	246	12,192	3.250	0.022	0.808	28.445
1998	199,976	2,000	2,400	14	242	11,999	3.199	0.022	0.795	27.993
1999	186,619	1,866	2,239	13	226	11,197	2.985	0.021	0.742	26.123
2000	129,683	1,297	1,556	9	157	7,781	2,074	0.014	0.516	18.153
2001	119,605	1,196	1,435	8	145	7,176	1.913	0.013	0.476	16.742
2002	132,498	1,325	1,590	9	160	7,950	2.119	0.015	0.527	18.547
2003	124,236	1,242	1,491	9	150	7,454	1.987	0.014	0.494	17.391
2004	116,144	1,161	1,394	8	141	6,969	1.858	0.013	0.462	16.258

Module Land-use change and forestry (New Zealand)  
 Submodule Grassland converted to forest land  
 Worksheet  
 Sheet Non-CO2 emissions from the on-site burning of scrub - CONTROLLED BURN ONLY

	Carbon release by on-site burning (t C)	Nitrogen released (t N/t c = 0.01) (t C)	Carbon in CH <sub>4</sub> emissions (ratio = 0.012) (t C)	Nitrogen in N <sub>2</sub> O emissions (ratio = 0.007) (t N)	Nitrogen in NO <sub>x</sub> emissions (ratio = 0.121) (t N)	Carbon in CO emissions (ratio = 0.06) (t C)	CH <sub>4</sub> emissions from burning (ratio = 1.333) (Gg CH)	N <sub>2</sub> O emissions from burning (ratio = 1.571) (Gg N <sub>2</sub> O)	NO <sub>x</sub> emissions from burning (ratio = 3.286) (Gg NO <sub>x</sub> )	CO emissions from burning (ratio = 2.333) (Gg CO)
1990	59,448	594	713	4	72	3,567	0.951	0.007	0.236	8.321
1991	54,756	548	657	4	66	3,285	0.876	0.006	0.218	7.665
1992	83,028	830	996	6	100	4,982	1.328	0.009	0.330	11.622
1993	103,795	1,038	1,246	7	126	6,228	1.660	0.011	0.413	14.529
1994	171,360	1,714	2,056	12	207	10,282	2.741	0.019	0.681	23.987
1995	131,106	1,311	1,573	9	159	7,866	2.097	0.014	0.521	18.352
1996	182,570	1,826	2,191	13	221	10,954	2.920	0.020	0.726	25.556
1997	157,937	1,579	1,895	11	191	9,476	2.526	0.017	0.628	22.108
1998	91,112	911	1,093	6	110	5,467	1.457	0.010	0.362	12.754
1999	110,599	1,106	1,327	8	134	6,636	1.769	0.012	0.440	15.482
2000	108,202	1,082	1,298	8	131	6,492	1.731	0.012	0.430	15.146
2001	121,640	1,216	1,460	9	147	7,298	1.946	0.013	0.484	17.027
2002	87,516	875	1,050	6	106	5,251	1.400	0.010	0.348	12.250
2003	95,605	956	1,147	7	116	5,736	1.529	0.011	0.380	13.383
2004	69,748	697	837	5	84	4,185	1.116	0.008	0.277	9.763

Module Land-use change and forestry (New Zealand)  
 Submodule Carbon emissions from liming soils

	Total annual amount of limestone (Mg)	Total annual amount of limestone (3 yr average) (Mg C)	Carbon conversion factor	Carbon emissions from liming (Mg C)	Emissions of CO <sub>2</sub> (Gg CO <sub>2</sub> )
1989	662,753				
1990	817,127	787,329	0.12	94,479	346
1991	882,107	882,107	0.12	105,853	388
1992	947,087	951,619	0.12	114,194	419
1993	1,025,662	1,033,210	0.12	123,985	455
1994	1,126,880	1,126,880	0.12	135,226	496
1995	1,228,097	1,152,047	0.12	138,246	507
1996	1,101,163	1,180,840	0.12	141,701	520
1997	1,213,261	1,213,261	0.12	145,591	534
1998	1,325,360	1,325,360	0.12	159,043	583
1999	1,437,458	1,437,458	0.12	172,495	632
2000	1,549,556	1,549,556	0.12	185,947	682
2001	1,661,655	1,661,655	0.12	199,399	731
2002	1,773,753	1,666,600	0.12	199,992	733
2003	1,564,392	1,634,179	0.12	196,101	719
2004	1,564,392	1,564,392	0.12	187,727	688
2005	1,564,392				

**Land use change matrix from 1997 to 2002 (based on the LCDB1 and LCDB2 data)**

		Land area categories from LCDB1 (1997) (kha)										Total
		FMp	FMn	CMa	CMp	GMh	GMI	WM	WU	S	O	
LCDB2 2002	FMp	1904.478	10.841	0.007	0.015	90.986	39.611	0.000	0.000	0.027	0.023	2045.988
	FMn	0.020	8182.228	0.000	0.000	0.281	0.005	0.000	0.000	0.031	0.033	8182.598
	CMa	0.000	0.003	333.590	0.000	0.119	0.000	0.000	0.000	0.000	0.006	333.719
	CMp	0.212	0.000	1.363	77.954	4.197	0.000	0.000	0.000	0.000	0.000	83.726
	GMh	0.132	0.928	0.000	0.000	8883.802	0.903	0.000	0.000	0.027	0.000	8885.793
	GM	1.250	2.801	0.000	0.000	0.135	5475.786	0.000	0.000	0.034	0.213	5480.217
	WM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001
	WU	0.000	0.001	0.000	0.000	0.646	0.019	0.000	531.244	0.038	0.014	531.960
	S	0.544	0.019	0.000	0.023	5.006	0.026	0.000	0.000	214.844	0.000	220.462
	O	0.002	0.192	0.000	0.000	0.043	0.018	0.000	0.000	0.000	1056.841	1057.095
	Total	1906.638	8197.012	334.960	77.992	8985.215	5516.369	0.000	531.244	215.000	1057.129	26821.559
	Net	139.350	-14.414	-1.241	5.734	-99.422	-36.152	0.001	0.716	5.462	-0.034	

**Land use change matrix from 1997 to 1998 (an example showing interpolated annual changes)**

		Implied land use changes from 1997 to 1998 (kha)										Total
		FMp	FMn	CMa	CMp	GMh	GMI	WM	WU	S	O	
1998	FMp	1906.206	2.168	0.001	0.003	18.197	7.922	0.000	0.000	0.005	0.005	1934.508
	FMn	0.004	8194.055	0.000	0.000	0.056	0.001	0.000	0.000	0.006	0.007	8194.129
	CMa	0.000	0.001	334.686	0.000	0.024	0.000	0.000	0.000	0.000	0.001	334.712
	CMp	0.042	0.000	0.273	77.984	0.839	0.000	0.000	0.000	0.000	0.000	79.139
	GMh	0.026	0.186	0.000	0.000	8964.932	0.181	0.000	0.000	0.005	0.000	8965.330
	GM	0.250	0.560	0.000	0.000	0.027	5508.252	0.000	0.000	0.007	0.043	5509.138
	WM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	WU	0.000	0.000	0.000	0.000	0.129	0.004	0.000	531.244	0.008	0.003	531.387
	S	0.109	0.004	0.000	0.005	1.001	0.005	0.000	0.000	214.969	0.000	216.093
	O	0.000	0.038	0.000	0.000	0.009	0.004	0.000	0.000	0.000	1057.071	1057.122
	total	1906.638	8197.012	334.960	77.992	8985.215	5516.369	0.000	531.244	215.000	1057.129	26821.559
	net	27.870	-2.883	-0.248	1.147	-19.884	-7.230	0.000	0.143	1.092	-0.007	

**Land use change matrix from 2003 to 2004 (an example showing extrapolated annual changes for 2003)**

		Extrapolated land use changes from 2003 to 2004 (kha)										Total
		FMp	FMn	CMa	CMp	GMh	GMI	WM	WU	S	O	
2004	FMp	2073.426	2.168	0.001	0.003	18.197	7.922	0.000	0.000	0.005	0.005	2101.728
	FMn	0.004	8176.758	0.000	0.000	0.056	0.001	0.000	0.000	0.006	0.007	8176.832
	CMa	0.000	0.001	333.197	0.000	0.024	0.000	0.000	0.000	0.000	0.001	333.222
	CMp	0.042	0.000	0.273	84.865	0.839	0.000	0.000	0.000	0.000	0.000	86.019
	GMh	0.026	0.186	0.000	0.000	8845.626	0.181	0.000	0.000	0.005	0.000	8846.024
	GM	0.250	0.560	0.000	0.000	0.027	5464.870	0.000	0.000	0.007	0.043	5465.756
	WM	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
	WU	0.000	0.000	0.000	0.000	0.129	0.004	0.000	532.104	0.008	0.003	532.247
	S	0.109	0.004	0.000	0.005	1.001	0.005	0.000	0.000	221.523	0.000	222.647
	O	0.000	0.038	0.000	0.000	0.009	0.004	0.000	0.000	0.000	1057.030	1057.081
	total	2073.858	8179.715	333.471	84.872	8865.908	5472.987	0.001	532.104	221.555	1057.088	26821.559